

THE CONQUEST OF THE ARCTIC

BY ACADEMICIAN
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FOR hundreds of years humanity has striven to unravel the mysteries of the North Pole, of the Arctic Ocean and of the polar basin. Intrepid men of many nations penetrated into the regions of eternal ice. Quite a number of them perished in the struggle against severe nature. But their work was not in vain. Our knowledge of the Arctic regions increased and became more definite with each new attempt to conquer the Arctic.

Mankind will forever cherish in its memory the illustrious names of the Arctic and Antarctic explorers of the past—Barentz, Bering, Franklin, Peyer, Wei-

precht, André, Nansen, Amundsen, Peary, Shackleton, Scott, Sedov, and of our contemporaries—Byrd and numerous others. The history of the exploration and conquest of the Arctic was marked by such momentous events as Fridtjof Nansen's journey in 1893-96 on the *Fram* and then on foot up to 86° northern latitude, and the journey of Robert Peary, the American explorer, to the North Pole in 1909. The courageous American was the first man to reach the North Pole.

But even these extremely difficult expeditions only partly lifted the veil concealing the mysteries of the North. Scientific research in the North was rare and sporadic. It bore no relation to the general scientific and vital interests of the various countries.

Gone is the time of the famed whalers of the 17th and 18th centuries who followed the coast of Greenland and penetrated far to the North in their small and poorly equipped vessels. One can only admire the courage and perseverance of these people. Still earlier, in the 16th

century, the first attempts to discover a northern sea route along the coasts of Europe and Asia to the coast of America had been undertaken by Dutchmen and Englishmen bent on finding a "new sea route to India."

A thorough exploration of the Far North requires close contact between science and practical work; it requires large resources, planned organization and constant scientific observation conducted on an extensive scale. The conditions for such work have been created in the Soviet Union.

I. SOVIET ACTIVITY IN THE ARCTIC

During the past ten years the U.S.S.R. organized a great number of successful scientific expeditions to the North. In 1937 a scientific research station was set up on an icefloe at the very North Pole. The four explorers—Papanin, Shirshov, Fyodorov and Krenkel—obtained remarkable results in the scientific investigation work which they carried on while drifting on their icefloe from the North Pole to the

coast of Greenland. It was during the same year, 1937, that the Soviet pilots, Chkalov and Gromov, each accomplished the feat of flying—for the first time in history—from Moscow to the U.S.A. via the North Pole.

It was no mere chance that these successes were achieved, and that they were achieved by the U.S.S.R. These expeditions, which have gained world-wide fame, were the result of many years of work of our scientists, our airmen and our seamen on the exploration of the North. In the course of this work scientific investigation was closely linked up with practical measures for the conquest of the Arctic.

Before we answer the question as to the reason for the Soviet Union's exploration of the Arctic, let us glance at the map of the Soviet Union. Her longest coastline is that of the Arctic Ocean and its parts: the Barentz Sea, Kara Sea, Laptev Sea, East Siberian Sea and Chukotsk Sea. The regions bordering on these seas comprise a vast part of the territory of the U.S.S.R. The climate in these regions is severe, but

the land is extremely rich in gold, coal, mineral salt, nickel, oil, and covered with tundra and large forests abounding in valuable fur bearing animals.

These regions are inhabited by the sturdy and capable peoples of the North. In the course of centuries of life in the Arctic they have developed amazing pluck and acquired a knowledge of natural conditions and the ability to adapt themselves to these conditions. They are remarkable hunters who cover hundreds and thousands of miles of entirely roadless country and still reach their exact destination. Under tsardom they were doomed to hunger and extinction. The Soviet Government, which knows neither privileged nations nor nations treated as stepchildren, been doing everything to help these peoples and has brought them increasing prosperity and culture.

How did the Soviet Union approach the problem of the conquest of the North?

Stalin pointed out that the main link in the chain, the link that had to be grasped first, was that of the Northern Sea Route.

Once we discovered and explored the route from Murmansk and Archangelsk to Kamchatka and Vladivostok we would connect the west and the east of the Soviet Union by sea, in addition to the existing railway line linking Moscow with Vladivostok. The Northern Sea Route would open up a way to the mouths of the rivers flowing into the Arctic and to the northern regions of the country which, owing to their remoteness from any railway line, had no outlet for their natural resources.

In order to tackle the problem of the Northern Sea Route it was necessary to start by exploring the North. This required proper equipment—icebreakers, airplanes, etc.—and, what was even more important, people fit for the job. The history of the conquest of the Arctic has given convincing proof that we have plenty of such people in our country. We have also created the requisite equipment.

The first step taken was to establish a network of polar stations on the islands and the coast of the Arctic Ocean. These serve today as the principal Soviet bases for the

study of the climate, the direction of the winds and the movement of the ice in the Arctic Ocean.

At the same time the icebreakers went into action. At first they cut out a passage to the mouths of the Ob, Yenisei and Lena Rivers; later they opened up a through route from end to end of the Arctic Ocean.

There had been individual explorers prior to this, who had succeeded in traversing the Arctic Ocean. But it had taken them two navigation seasons, which detracted from the practical and economic value of their achievement, since there is no commercial advantage in using a route which it takes one or two years to cover.

The icebreaker *Sibiryakov* was the first to traverse the Arctic Ocean in one navigation season in 1932. The distance between Archangelsk and the Bering Strait was covered in two months and four days. The trip was attended by a number of mishaps. In the beginning the screw-blades were broken by the ice. When these were replaced, the main shaft broke. After

that the icebreaker proceeded under sails, but the passage was completed nevertheless.

The following year, 1933, the *Chelyuskin* sailed along the same route and also succeeded in reaching the Bering Strait. But here the *Chelyuskin* was caught in the ice which dragged the ship back in its stream. Jammed by the ice, the ship sank. The 104 people who made up its crew and passengers spent two months on the ice before they were saved by the Soviet airmen who amazed the world by their courage and their skilful, organized and precise work carried on under extraordinarily difficult conditions.

Since then, beginning with 1934, Soviet boats have been crossing the Arctic Ocean along the Northern Sea Route in ever increasing numbers. It is no longer solitary ships that enter the mouths of the Northern rivers, but dozens of them at a time put in there, bringing with them people, building materials, food, machines, and carrying back ore, coal, timber, furs. The regions which so recently still represented

an uninhabited wilderness are now covered with a rapidly increasing number of new towns, villages, factories and educational centers.

II. THE EXPLORATION OF THE ARCTIC

What is expected of science as its contribution to the practical exploration of the Arctic Ocean and the adjacent territory?

In the first place, exact maps, showing the depth of the sea, all islands, shoals and reefs, deviations of the magnetic needle, the character of the sea bottom. In the past five years a great deal has been accomplished along these lines. As a result of a thorough study of the Arctic Ocean, a considerable number of newly discovered islands have been put on the map, while some islands that were erroneously traced have been "eliminated."

Here is the curious story about the "discovery" and subsequent "elimination" of one such island in the Arctic Ocean.

In the seventies of the last century

a Norwegian captain by the name of Johansen discovered in the northern part of the Kara Sea an island which he named "Lonely Island." In 1930 we sailed to the place which was indicated on the map as the location of this island. We criss-crossed the place several times, but found no trace of an island. We looked for it again in 1931 and 1932, but with just as little success. Only in the following year did we accidentally come across an island situated in a different part of the Ocean, sixty miles away. This island was not indicated on the map. After we had made a study of its outlines we arrived at the conclusion that it was that very elusive "Lonely Island." Captain Johansen, owing to the faultiness of his measuring instruments, had made an error in determining its location and had wrongly traced it on the map. We thus had to "move" this island to its proper place.

The Great Northern Sea Route has been equipped with radio and meteorological stations.

It has also been necessary to set up repair bases and supply bases for coal and fresh water, and to provide the ports with lighters and other auxiliary craft. It is by accomplishing all these tasks that we are, in the main, mastering the Northern Sea Route. I say, "in the main," because the work of mastering the sea route cannot be separated from other tasks.

The difficulty is that the ice in the Arctic Ocean is constantly in motion. Now and again it blocks up the sea route, rendering the passage of ships difficult or impossible. In order to sail along the Northern Sea Route we must know the laws governing the movement of the icefloe. And this means that we must study the direction of the winds and the ocean currents, which affect the shifting of the floe. The winds and the currents take their origin in the northern regions of the Arctic Ocean, including the regions bordering on the very Pole.

There are two principal means for carrying on the work on the solution of these and other scientific problems. First, per-

manent scientific polar observation stations located on the islands and the coast of the Arctic Ocean; and, second, expeditions on icebreakers. Both means are widely used in the Soviet Union. Each year icebreakers loaded with building materials and scientific apparatus make their way through the ice to the remote islands. The icebreakers bring people who erect buildings for radio stations and scientific observatories on the islands. They also land groups of scientific research workers who remain on the islands for the winter. These scientific workers constantly study the weather and transmit their observations by radio to the mainland. The information transmitted by the meteorologists is studied in the Central Weather Institute, and it furnishes an inestimable contribution to the weather forecasting for the entire northern hemisphere, since the weather is to a very large extent "produced" in the North. The staffs of the scientific station are also engaged in gravimetical and astronomical observations, in the observation of magnetical and other

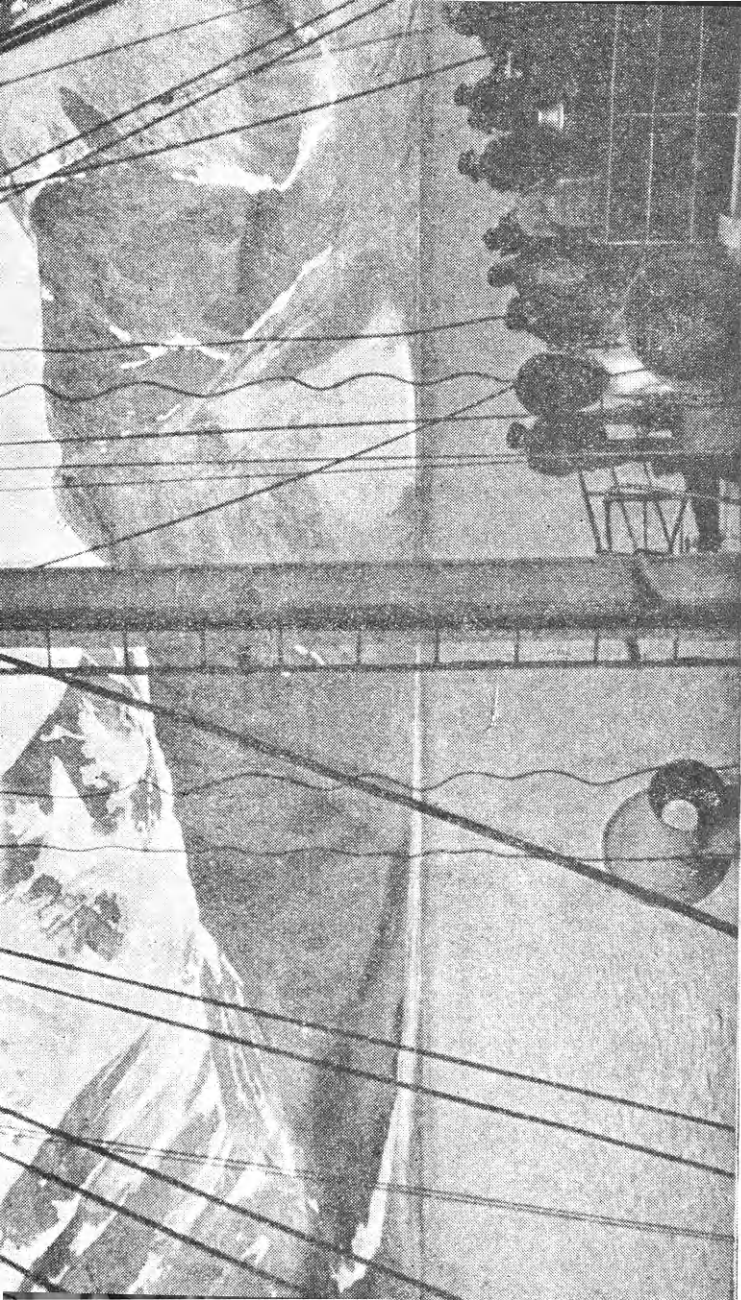
phenomena, and in the study of the flora and fauna and of the geological structure of the islands and the mainland. The Soviet Government provides these research workers with the best possible conditions for their work. They live in well-built warm houses and maintain constant radio communication with the mainland. Special radio broadcasts are arranged for them to keep them constantly informed of the life of their country. Despite the thousands of miles that separate them from home, despite the polar night, the cold and the blizzards, they always feel their close contact with the whole country, take part in its political life, talk to their families over the wireless, etc.

Polar stations have been set up on the Arctic islands and along the entire coastline. There are scientific stations on Franz Josef Land and on Novaya Zemlya, on Severnaya Zemlya and on the shores of the Chukot Peninsula neighboring on Alaska—altogether 51 stations in the Soviet Arctic.

Severnaya Zemlya, which represents a

group of islands north of Asia, was discovered in 1913. But at that time only the southeastern tip of this group was known. The first time we reached the western and northern shores of this archipelago was in 1930, on the icebreaker *Sedov*. We built a polar station and left there four scientific research workers with the well-known polar explorer G. Ushakov at their head. G. Ushakov with one or two members of his staff, riding on dogsleights, would travel for months on end through the interior of the islands, trace new lands on the map and engage in scientific observation. In two years he thus covered more than three thousand miles. Severnaya Zemlya is now explored not less than any part of southern Siberia.

While the Soviet icebreakers are cutting their way through the ice for the purpose of setting up new polar stations or reinforcing the staffs of existing scientific stations, the people on board study the entire route, sound the depths of the ocean, analyze the chemical composition of the water at



An Excursion to Novaya Zemlya

various depths and of different currents, register the direction and velocity of the currents, etc. Icebreakers have been frequently sent far out into the Ocean, specially for the purpose of scientific investigation. All these expeditions have served to train hundreds of experienced people who know the North, are able to live in the North and are not afraid of difficulties.

III. THE EXPEDITION TO THE NORTH POLE

The expedition to the North Pole in 1937 was the culmination of work that had been carried on for many years. Having been appointed to lead the expedition, I, together with my assistants headed by the well known polar explorer M. I. Shevelov, worked hard for a year and a half preparing for it. We had the powerful assistance of the Soviet Government and enjoyed the constant attention of Comrade Stalin who was the inspirer of the expedition. This enabled us to make very careful preparations.

Others had reached the North Pole before us. In 1909 Robert Peary, traveling with a dog team, had crossed on the ice from the northern tip of America to the Pole. The intrepid American had been limited in his opportunities for investigation. With a dog team as his means of transportation, he could take along but an extremely small load and could not stay more than one day at the Pole. He had established that there were no islands at the North Pole, but only a deep ocean covered with ice. But he had not even been able to measure the depth of the ocean. He had sunk all the cable at his disposal to a depth of 7,544 feet, but had not reached bottom. We have subsequently established that the depth of the ocean at that place is 4,290 meters (about 14,070 feet). Neither could Peary ascertain whether the ice was moving and in what direction. It had been still less possible for him to find out anything definite regarding the weather in the region of the North Pole—it is obvious that one day could not be sufficient for this purpose.

The magnificent exploit of the famous American indicated the necessity of continuing his work and enlarging upon his experience. However, for nearly thirty years nothing had been done along these lines. True, flights to the Pole had been made during this period by Byrd, Amundsen and others. But since no landings had been made at the Pole these flights added but little to what we had already known from Peary. It had become clear that a different technique was needed; that it was not sufficient just to fly over the Pole, but that what was required was to land at the Pole and stay on the ice long enough for extensive scientific observations. This was the task we had set ourselves.

There were great technical difficulties to be surmounted. Authorities throughout the world considered that it was impossible to make a landing on moving ice with land planes, and we could not think of using seaplanes, because fissures between the ice are very rare at the Pole, and the few that may be found are too small and not constant. A poll taken by the Moscow *Izvestia* among

the best authorities on the Arctic throughout the world elicited the universal opinion that a flight like the one we planned could not be realized. Still we were firmly convinced of the successful issue of our undertaking. Our conviction was based on the knowledge of the Arctic which we had gained during the preceding years of scientific study and investigation.

Personally, I had no doubt that we would find comparatively smooth ice-fields in the vicinity of the North Pole. My conviction proceeded from the idea that fissures and hummocks are formed in the ice when in its movement it meets obstructions in the shape of land or shoals. At a distance from the shore such phenomena are also possible, but they are likely to occur more rarely and would be smoothed away by time.

It had also been suggested that only a small plane be sent or that a landing be made with parachutes. As is universally known, the technique of such landings has been highly perfected in our country. However, we made our flight in four heavy

four-engine planes. We had to use heavy airplanes because our instructions called for the setting up of a regular scientific station at the Pole, with proper living quarters, a radio plant with a wind-driven motor, complex scientific apparatus and instruments, and a food supply and fuel to last for a year and a half.

The four heavy planes, accompanied by a number of smaller ones, assembled on Rudolph Island, which is the northernmost of the Franz Josef group. On May 21, 1937, the first of these airplanes, piloted by the famous polar flyer, M. Vodopyanov, landed at the North Pole. In addition to the crew, this plane carried the four members of the staff of the future scientific station and myself. We flew above the clouds at an altitude of over two thousand meters (about 6,500 feet). When our astronomical co-ordinates indicated that we were above the Pole we began to descend. Our suspense was at its highest: would there be an end of the clouds, would we see the ice before we hit it? And what kind of ice would we find—smooth, or full of

fissures and hummocks? At an altitude of 500 meters (1,640 feet) we came out of the clouds and we saw under us vast ice-fields stretching to the horizon, with fissures far between, each ice-field extending over an area of several square miles—a number of landing fields prepared by nature itself. Our theory was thus substantiated.

The pilot, M. Vodopyanov, made a perfect landing on an icefloe amid the silent vastness of the central polar region. Several days later the other airplanes landed at the Pole and we rigged up a radio station. After having spent sixteen days at the Pole we took off on our homeward journey, leaving our four comrades to carry out the difficult exploit that had been assigned to them.

Papanin, Shirshov, Fyodorov and Krenkel—the four comrades who were left at the Pole—immediately made themselves at home. From the very first day the scientific instruments were put to work. The depth of the Ocean was ascertained. In the course of nine months these comrades

were regularly engaged in collecting extremely valuable scientific material pertaining to meteorology, magnetism, gravimetry, the study of the currents, the physics and chemistry of the sea, geology, etc. As had been foreseen by Soviet polar experts, the drifting of the ice carried the station towards the shores of America, at first slowly and then at an ever increasing velocity, until, in January 1938, the icefloe reached the shores of Greenland where it broke apart. The courageous four did not lose their self-possession and continued their work on the remaining hundred-foot fragment of the icefloe until the arrival of the icebreakers that had been sent to their rescue. On February 19, 1938, the celebrated explorers had reached latitude 70°54' north.

The work accomplished by Papanin, Shirshov, Fyodorov and Krenkel represents an extremely important contribution, not only to the study of the polar regions, but also to the science of geography as a whole. These four brilliant workers completed a program of scientific research

which would have done credit to twenty and more scientists. The records of this expedition are now being put into final shape, and they will shortly be published in several volumes. Comrade Papanin's personal diary, already published, is one of the most interesting documents of human perseverance.

IV. THE NORTHERN SEA ROUTE

It has been mentioned above that the principal task set by Comrade Stalin in connection with the work in the Arctic was that of opening up a northern sea route from the shores of Europe to the shores of eastern Asia across the Arctic Ocean. A special government body—the Main Administration of the Northern Sea Route—was created for the purpose of co-ordinating all the activities—scientific, exploratory and economic—in the Far North. The Main Administration of the Northern Sea Route has been placed in charge of an icebreaker fleet, the polar aviation service and the



I. Papanin, Head of the Drifting "North Pole" Scientific Station,
with His Dog "Vesyoly," on the Icefloe

economic establishments engaged in mining, fur buying, trade with the local population, etc., in the Far North. After the beginning made in 1932 (the expedition on the *Sibiryakov*), scores of ships have been plowing the Arctic Ocean every year, some crossing it from end to end, others heading for the mouths of the great Siberian rivers, bringing in and taking back goods, or putting in at the port of Igarka on the Yenisei River and returning loaded with the world-renowned Siberian timber. Navigation in the Arctic Ocean requires a special technique. Each group of ships is preceded by a powerful icebreaker which clears the way through the ice for the whole caravan. Wherever the ice is particularly heavy the icebreaker leads each ship separately through the difficult spot, sometimes taking the ship in tow. The entire burden of the struggle with the ice devolves on the icebreaker, which cuts its way through with its powerful body, ensuring a safe passage for the ships in its wake. At the same time smaller icebreakers are engaged in reconnoitering the condition

of the ice and keeping watch in the most dangerous spots.

The first powerful icebreaker was built at the end of the past century. It was the famous *Yermak*—the “grandfather” of the icebreaker fleet—designed by the Russian Admiral Makarov. To this day it sails every year in the Arctic Ocean. A still more powerful icebreaker is the *Krassin* (10,000 h. p.) which operates in the eastern half of the Arctic. It has frequently put in at the harbors of Alaska. Four just as powerful icebreakers of the latest design and equipped with up-to-date machinery have now been built on Soviet wharves. Three of these icebreakers, the *J. Stalin*, the *V. Molotov* and the *L. Kaganovich*, have already started active service. Large port facilities are under construction along the Northern Sea Route—on the Island of Dixon, in the mouth of the Lena River (Tixie Bay), and in a number of other places.

In these first years of the operation of the Northern Sea Route there have been cases of ships stranded for the winter. These were ships that had strayed from the

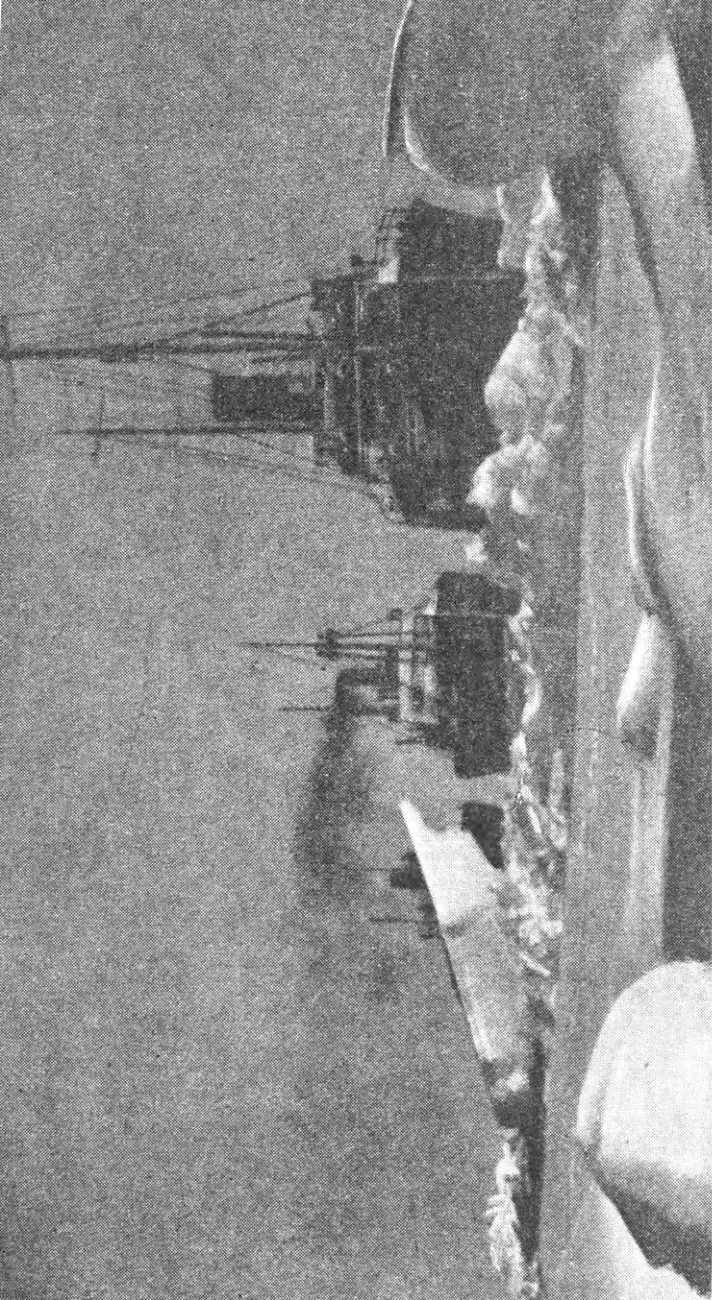
caravan or had ventured too far north unaccompanied. They were released by powerful icebreakers the following summer. In each case all these operations were brought to a successful conclusion. This year the icebreaker *Yermak* released a number of ships stranded in the ice. Some of these ships were as far as 83° N., which is a record for navigation in the North. One small icebreaker, the *Sedov*, remained icebound and has drifted to a point beyond 86° northern latitude. This ship is equipped as a scientific laboratory and is making valuable observations in a part of the Arctic which has never been reached before by any ship (north of the famous drifting of Nansen's *Fram*). With the new powerful icebreakers joining the service it will be possible in the future to prevent any ships being imprisoned in the ice for a winter.

The Northern Sea Route has become a paying enterprise of great benefit to the national economy of the U.S.S.R. Our polar navigators have learned to maneuver splendidly and find the best route amid the ice banks. In this they have the active

assistance of our polar aviation service. Airplanes regularly reconnoiter the ice both along the coast and within a distance of up to seven hundred miles from the coast.

V. THE POLAR AVIATION SERVICE

Icebreakers and airplanes are the principal up-to-date technical means employed in the conquest of the Far North. Perhaps in no other place have the potentialities of modern aeronautics been so strikingly revealed as in the Far North. Thousands of miles of uninhabited territory devoid of any means of communication are easily covered by airplanes which bring culture and civilization to the remotest corners of this territory and extend the power of man to the very Pole. Flying in the Arctic regions requires special skill. A pilot who has been accustomed to follow the regular air routes from radio beacon to radio beacon, or along the railway lines, or other easily visible landmarks, would find flying in the Arctic very difficult at first. All the pilot sees from his



Along the Northern Sea Route. An Expedition to the Mouth
of the Lena

plane is an endless white wilderness. Fogs are very frequent. In case of a forced landing the pilot must exercise exceptional skill. Yet people fly in the North and over the Arctic Ocean. There is a regularly functioning airline to Dixon Island and Tixie Bay (the mouth of the Lena). There is a group of airplanes in constant operation on Chukot Peninsula. Airplanes reconnoiter the ice in the ocean and assist in guiding the ships through the ice. Passengers, mail, newspapers, goods, scientific instruments, are carried by air to remote settlements. In the past few years scores of polar flyers have acquired the special training and skill needed for their work in the Arctic.

An important turning point in the development of the Soviet polar aviation service was the rescue of the crew and passengers of the *Chelyuskin*. This ship sank in February 1933. The entire world was then stirred by this Arctic tragedy which forced 104 people, who had witnessed the sinking of their fine ship, to camp for several months on the ice, far from the shore.

The Soviet Government immediately set in motion a powerful machinery to rescue the Chelyuskinites. Seven of the best polar flyers—Levanevsky, Lyapidevsky, Molokov, Vodopyanov, Kamanin, Doronin and Slepnev—brilliantly accomplished the task assigned to them. Under the difficult conditions of the Arctic winter they succeeded in reaching the Chukot Peninsula, finding the camp lost in the icy wastes, and landing on the aerodrome which we had managed to improvise. All the hundred and four were safely brought to the mainland and returned to their homes. As for myself, I was ill at the time and was therefore taken to the nearest hospital in Nome, Alaska. I returned home through the U.S.A. and was thankful for the opportunity I had to witness and appreciate the cordial regard shown by the American people for our polar explorers. It was thanks to the energetic help of the entire Soviet Union, thanks to the organization of the Chelyuskinites on the icefloe, and thanks to the supreme courage and high sense of duty displayed by our flyers,

that the epic of the *Chelyuskin*, which had begun as a polar tragedy, was converted into one of the greatest victories of man over the elements. The flyers who accomplished this feat were the first on whom the title of Hero of the Soviet Union was conferred.

In the succeeding years the range of polar flights increased. Immediately following the setting up of the scientific station at the North Pole, two brilliant flights from Moscow to the U.S.A. were accomplished, which will forever live in the annals of aviation. The first was the flight made by Comrade Chkalov with Comrades Baidukov and Belyakov from Moscow to Portland. It was the first non-stop flight from Europe to America via the North Pole. The second was the flight made by Comrade Gromov with Comrades Yumashev and Danilin from Moscow to San Jacinto, California.

The Soviet flyers made a beginning in traversing this shortest route between the Soviet Union and the United States. It is to be hoped that in the not too distant future regular communication will be es-

tablished along this route between the two great nations whose co-operation will contribute substantially to human progress.

We shall always remember with gratitude the flights of the Americans Wilkins and Kenyon in search of Levanevsky's airplane which had been wrecked in the Arctic. The difficulties attending flying in the Arctic are so great that we can only marvel at the comparatively very small toll in human lives paid by the Soviet aviation forces in the process of surmounting them.

VI. ECONOMIC DEVELOPMENT AND CULTURE

The introduction of ocean and air transport in the Arctic has been the key to the opening up of this vast territory and to the development of its resources. Formerly desolate regions are waking up to new life. The hunter who roams the tundra in quest of the fur of the silver fox is no longer the sole visitor in these parts. Mines are now being sunk there and facto-

ries built. The North is taking its place in the economic life of the country. Its population is rapidly increasing. The native population, the peoples of the North who enjoy the solicitude of the Soviet Government, have been given extensive facilities for economic and cultural development. The process of degeneration which was observable among some of the small nationalities of the North in the times of tsardom has not only been stopped but reversed, and we now observe a rapid growth of these nationalities. Many schools and hospitals have been built. Educational centers have been created for the nomad reindeer breeders. Here their children live in special homes and receive an education like that of all the children of the Soviet Union. Radio and gramophones have become a regular accessory of life in every tundra settlement. A considerable number of youths and girls of the Northern peoples (Evenki, Chukchi, Nentsi, etc.) attend higher educational institutions. The special Institute of the Peoples of the North in Leningrad is both a higher educational

institution and a scientific center for the study of the languages, folklore and economic life of the peoples of the North.

During the last ten years the city of Igarka, with sawmills and other industrial enterprises, has grown up in the lower reaches of the Yenisei. Another rapidly growing town, Dudinka, with mines in the neighborhood, is situated still farther north. Geologists have discovered rich deposits of various useful minerals in the polar regions of the U.S.S.R. The steamers following the Northern Sea Route get their coal in the North. In the near future the Main Administration of the Northern Sea Route will have its own northern oil fields.

Trade in the North is concentrated in the hands of the state and is conducted through the Main Administration of the Northern Sea Route. Good prices are paid for fur and for fish. The prosperity of the population is steadily growing and there is a constantly increasing demand for goods in the North. The delivery of goods by the sea route has considerably sped up transportation and reduced its cost.

The rapid growth of the population raises the problem of developing agriculture in the North. At present even the most remote polar stations have their hothouses in which various vegetables are grown. In a number of places north of the Arctic Circle a beginning has been made in developing agriculture and stock-raising. Igarka, for instance, grows its own vegetables and has a sufficient supply of milk from its own dairies.

Socialist economic requirements and science, practical considerations and the lofty aspirations of scientific investigators, have combined to form a mighty movement which has opened the road of development and progress to even the most remote parts of the globe. Soviet science, enjoying the powerful support of the Soviet nation and its government, and inspired by Stalin—the moving spirit behind all the great victories over the Arctic—has not yet said its last word in the struggle for the exploration and conquest of the severe wastes of the vast North. The Soviet scientists and polar workers have already suc-

ceeded in making their contribution to the storehouse of science of the U.S.S.R. and of the whole world. But this is only a beginning. There is no doubt that the men and women of the Soviet Union will successfully complete the great task of the conquest of the Arctic.

